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COMMENTS OF  
THE ENVIRONMENTAL DEFENSE FUND  
ON  
Mass Emissions Reduction Strategy for Selenium

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## SUMMARY

The Environmental Defense Fund strongly supports the implementation of a mass emissions strategy to limit the amount of selenium entering the San Francisco estuary. The mass emissions approach is fundamentally sound, appears tailor-made for the circumstances which currently exist with respect to selenium accumulation in the estuary, and can be implemented in a manner which benefits both the environment and the discharger community.

Because the proposed program will be one of the first to implement the State's Mass Emissions Strategy, several significant details remain to be resolved, such as the specific ecological assessment guidelines, the temporal and geographical units within which emissions limits will be allocated, and methods for determining ultimate compliance with ecological assessment guidelines. For refinery emissions in Suisun Bay, however, implementation of the program can proceed concurrently with the refinement of the program, once the default provisions -- the emissions reduction schedule -- have been adopted.

Tradable discharge permits should be considered as an implementation tool. A well-designed trading program can meet environmental goals without sacrificing the Board's enforcement authority, and the potential cost savings to the discharger community may be substantial.

## A MASS EMISSIONS LIMIT IS THE RIGHT TOOL

The Regional Board staff, as well as members of the public, governmental and scientific community, are correct in concluding that current discharges of selenium into the San Francisco estuary are causing damage. The fact that ambient concentrations of selenium are generally an order-of-magnitude below existing water quality standards, however, signals the need for a new enforcement tool which will limit the quantity of selenium as well as its concentration.<sup>1</sup> One option is to re-derive site-specific water quality standards that account for the transfer of selenium from the water column into both sediments and food chain organisms and thereby limit indirectly the quantity of selenium. Translating the ecological loading limits into water quality standards challenges the ability of the scientific community and is time-consuming, but can be done.

Another option is to forego (or supplement) this translation step and simply limit selenium loading directly. This is the approach envisioned by the State's Pollutant Policy Document, supported by EDF, and which appears

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<sup>1</sup> This concept was discussed in some length in the Environmental Defense Fund's comments on the Mass Emissions Strategy proposed in the state's Pollutant Policy Document (see attachment).

tailor-made for the selenium problem at hand.<sup>2</sup> With this approach, selenium loads which are currently too high can be gradually decreased until water column, tissue and sediment monitoring data demonstrate that a safe level has been achieved. This option must, however, be designed to be no less enforceable than the traditional method of enforcing water quality standards; tissue and sediment concentration limits and the mass emissions limits derived from them must be enforceable.

Having determined that a staged cutback in selenium emissions from refineries in the Suisun region is required, we support the adoption of a schedule of the type proposed in Table 7 of the staff report, as long as it meets applicable legal requirements. An enforceable schedule provides several benefits to both the environment and the regulated community. On behalf of the environment, the schedule should represent the scientific community's best judgment at the ultimate requirements for emissions reductions. For the dischargers, a schedule provides the certainty required to determine investment decisions. It is important to note that improvements in scientific understanding can be incorporated into the process at any time by simply changing the schedule's endpoint. In other words, if the "best judgment" is too low, the cutbacks might end at 75% of the baseline rather than the currently-proposed 90%. This possibility provides an incentive for the dischargers to support additional scientific understanding without delaying the implementation process.

#### PROPOSED REFINEMENTS

The proposed mass emissions limits and associated implementation program must contain enforcement tools which are equally as effective as those available under the current NPDES system of enforcing water quality standards. The widespread concern that mass emissions limits will be less stringent and less enforceable than traditional water quality standards (and associated permit limits) must be addressed prior to program adoption.<sup>3</sup>

While the concept of adopting ecological assessment guidelines to test the adequacy of the emissions reduction program is sound, EDF has reservations regarding the specific recommendations for the target value for water. A reasonable limit for water concentrations -- calculated by the methodology which uses literature values for algal bioconcentration factors -- would appear to be no more than half the limit which was calculated using statistical correlations of suspended material with

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<sup>2</sup> One of the primary examples cited by EDF in its support of the Mass Emissions Strategy was the problem of selenium accumulation in Suisun Bay.

<sup>3</sup> Should the Board decide to adopt water quality, sediment and tissue standards as a substitute for the ecological assessment guidelines, however, the process could be undertaken concurrently with implementation of an emissions reduction schedule.

selenite concentrations.<sup>4</sup> The apparent inadequacy of the water guideline does not affect the proposed program at the outset, but should be resolved during the first years of the program.

Limits on the quantities of selenium should be calculated separately for each discrete geographical subunit in the estuary. The limits proposed for the refineries accomplish this geographic division de facto because the refineries are all located in the Suisun/Carquinez region. Subsequent loading limits for sewage treatment plants, urban storm runoff and riverine inputs should be derived separately for the extreme South Bay, Suisun/Carquinez, and other ecologically-relevant subdivisions.

Further thought should also be given to the use of a time-step shorter than one year for two reasons: first, large pulses of selenium inputs may result in "hot spots"; and second, selenium inputs may be more deleterious in low-flow than in high-flow seasons, depending upon the location of the outfalls.<sup>5</sup>

#### IMPLEMENTATION RECOMMENDATIONS

The nature of both the proposed mass emissions limits and the characteristics of the regulated community appear tailor-made for the use of tradable discharge permits. Economic theory, supplemented by a growing range of experience, concludes that tradable discharge permits provide the least expensive means to meet a regional pollutant loading goal.<sup>6</sup> In addition, tradable permits provide valuable flexibility to the regulated community, promote innovation, provide a cost-sharing mechanism during the initial stages of a mass emissions cutback, and -- most important -- actually meet a predetermined environmental goal.

A tradable discharge permit system works as follows:

-- First, a pollutant loading goal is adopted for the region, in this case a selenium loading limit for each year for the refineries in the Suisun/Carquinez region;

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<sup>4</sup> The limit may be calculated by adjusting the bioconcentration factor for marine algae determined in laboratory studies to match the selenium concentration range actually found in Suisun Bay by using a generalized partition coefficient/water concentration regression of the type presented in Figure 6.

<sup>5</sup> We note that the Regional Board staff has investigated the use of "rolling averages" for measuring compliance with annual loads. This would be one method to avoid damaging pollution pulses.

<sup>6</sup> See Hahn, Robert W., and Roger G. Noll, "Designing a Market for Tradable Emissions Permits," in W. Magat (ed), Reform of Environmental Regulation, Cambridge & Ballinger, pp. 119-145; Hahn, Robert W., "Economic Prescriptions for Environmental Problems: How the Patient Followed the Doctor's Orders," Journal of Economic Perspectives, vol. 3 no. 2 (1989) pp. 95-114; Tietenberg, Tom, Environmental and Natural Resource Economics, second edition, (Glenview, Il., Scott, Foresman and Co., 1984).

- Second, the initial allocation of allowable pollutant emissions for each discharger is prescribed;<sup>7</sup>
- The initial allocation is enforceable, just as NPDES "allocations" are enforceable, until the allocation is amended by participation in the tradable permit market;
- Dischargers may sell portions of their allocations, or buy portions of allocations from other "willing-seller" dischargers at market-determined prices;
- The increased (or decreased) allocation becomes the enforceable permit limit for the individual discharges.

The advantages of a tradable permit system to the regulated community can be significant. The total costs of meeting a regional pollution goal are, in the worst case, equivalent to a standard permit system (if the initial allocations remain unchanged by any trades). The best case can represent considerable savings.<sup>8</sup> These savings occur because the tradable discharge market encourages those dischargers with the lowest marginal costs of abatement to make the biggest cutbacks in pollution load and defray the pollution control expenses by selling excess allocations, and those dischargers with the highest marginal costs of abatement to make the smallest cutbacks in pollution load but pay instead to purchase additional allocations. As a result, the net cost to the discharger community is minimized.

The size of the potential savings depends, in part, on the magnitude of the marginal cost differences among the refineries. Because the total regional pollution goals will decrease over time, the potential savings may well change from year to year. Ultimately, substantial investments may be required at all plants, and (if the marginal costs of pollution abatement are similar for all of the plants) the potential savings from a tradable discharge permit program may well decrease. Even under this scenario, however, a tradable discharge permit program offers a mechanism for cost-sharing among the refineries during the phase-in period.

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<sup>7</sup> The initial allocation may be determined by the Regional Board or by an initial auction. If determined by the Board, the initial allocation may be the same as the NPDES permit allocation, or may be derived by some other formula. Significant equity ("fairness") issues arise with the initial allocation, but are tempered by the fact that the allocation can be amended by participation in the market.

<sup>8</sup> In the arena of air quality regulation EPA's emission trading program for local air quality has saved more than \$4 billion with no adverse effect on air quality. EPA's lead trading program has saved about \$20 million annually in compliance costs. (cited in Robert N. Stavins, Bradley v. Whitehead, "Dealing with Pollution: Market-Based Incentives for Environmental Protection", Environment vol. 34, no. 7 (1992).) Experience with point source tradable discharge permits for water quality regulation has resulted in annualized cost savings ranging from \$40,000 in the upper Hudson River to \$27 million in the Holston River. (Industrial Economics, Inc., The Benefits and Feasibility of Efficient Trading Between Point Sources: An Analysis in Support of Clean Water Act Reauthorization: EPA Contract 68-W1-0009., May 1992).

Among the other, non-pecuniary benefits of a tradable discharge program are its inherent flexibility and the incentives it provides for pollution control innovation,<sup>9</sup> and a predetermined pollution target or ceiling against which to judge compliance.

The viability of a tradable discharge permit market is determined not only by the economic characteristics of the regulated community, but also by the rules under which the market operates. Most of these rules could be designed by the Regional Board. For example, the transaction costs of each trade should be minimized. This can be accomplished, in part, by approving the rules for trading, but not requiring Regional Board or Environmental Protection Agency approval of individual trades.<sup>10</sup> Similarly, unnecessary restrictions on the magnitude of trades should be avoided. While it is clear that some limitations will have to be imposed on the magnitude of individual trades in order to prevent localized "hot spots", these limitations should be minimized to the extent that it is ecologically justifiable.

Regardless of the details of the trading program, however, effective monitoring and enforcement of the traded allocations are critical. Monitoring and enforcement assure the dischargers that the trades will be honored and assure the public that the environmental goals will be met.

One disadvantage of the current proposal for the refineries, with or without tradable discharge permits, is that they are expected to reduce emissions to meet the ecological objectives in advance of similar controls on urban stormwater runoff, sewage treatment plants, and upstream inputs to rivers. It is clearly in the interest of the refineries to include these dischargers in the mass emissions reduction scheme. We see no *a priori* reason why these additional classes of dischargers could not be included eventually in a tradable discharge permit system.

#### CONCLUSION

The Environmental Defense Fund commends the Regional Board for developing a mass emissions strategy which responds to the ecological characteristics of the problem at hand. Despite the need to work through additional implementation details, the program holds great promise. We encourage the Regional Board to consider using tradable discharge permits to implement the program. It is unnecessary to delay the adoption of the proposed mass emissions reduction schedule in order to use tradable

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<sup>9</sup> See Stavins, Robert N., "Harnessing the Marketplace", EPA Journal, vol. 18, no. 2 (May/June 1992); Tiefenberger, T.H., Emissions Trading: An Exercise in Reforming Pollution Policy (Washington, D.C.: Resources for the Future, 1985); Willey, Zach, "Using Market Incentives to Protect Water Quality in America", in Update (Universities Council on Water Resources), no. 88, Spring 1992.

<sup>10</sup> The Regional Board role may be minimized further by assigning the day-to-day functioning of the market to a third party, whose expenses could be paid by transaction fees. This option raises the transaction costs, but avoids the requirement for the Regional Board to cover these expenses directly and train staff.

discharge permits. The first year of implementation of the reduction schedule can proceed using traditional regulatory tools, and the tradable permit program can be phased in for the second year. In order to optimally design the program and address the concerns of both the dischargers and the public, the Regional Board may wish to convene a task force to aid in the design of the program.